

# A Zero Power, Motion Sensitive MEMS Wake-Up Device



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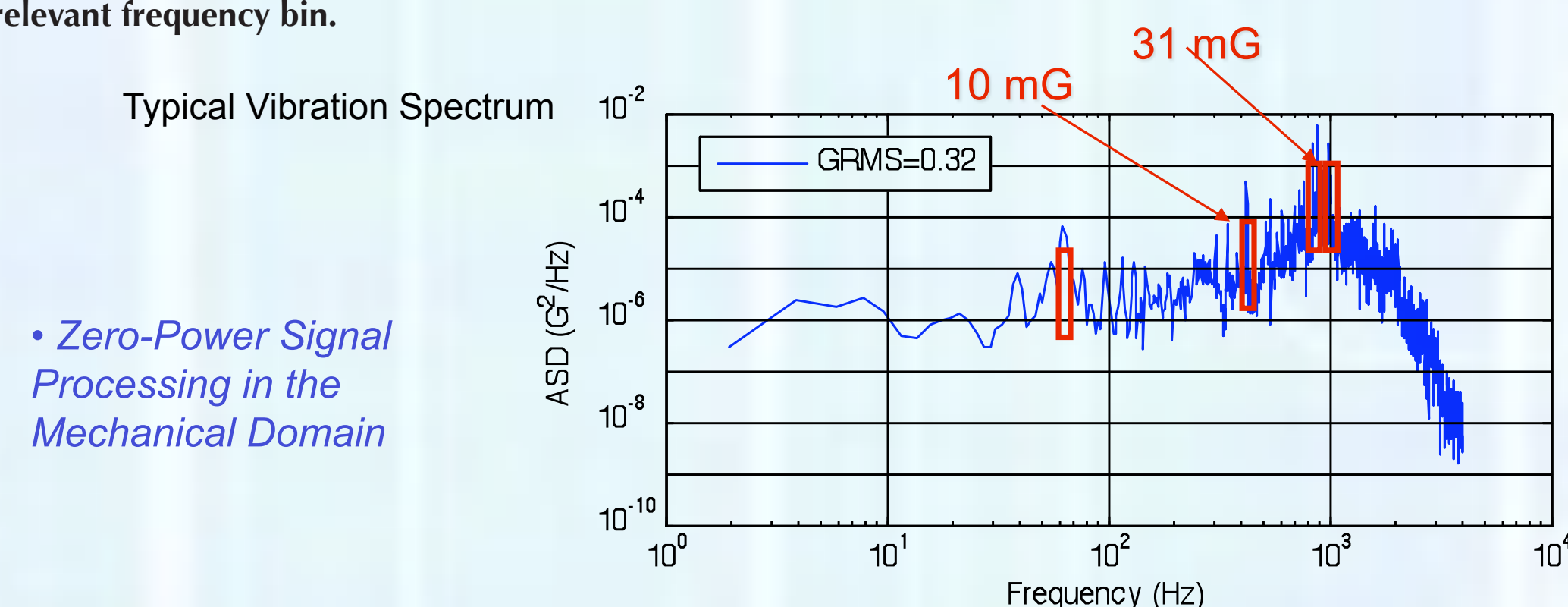
## Problem

### Goal:

- A miniature device capable of waking-up an electronic circuit in the presence of a specified vibration profile while consuming near-zero power (< 100 nW).

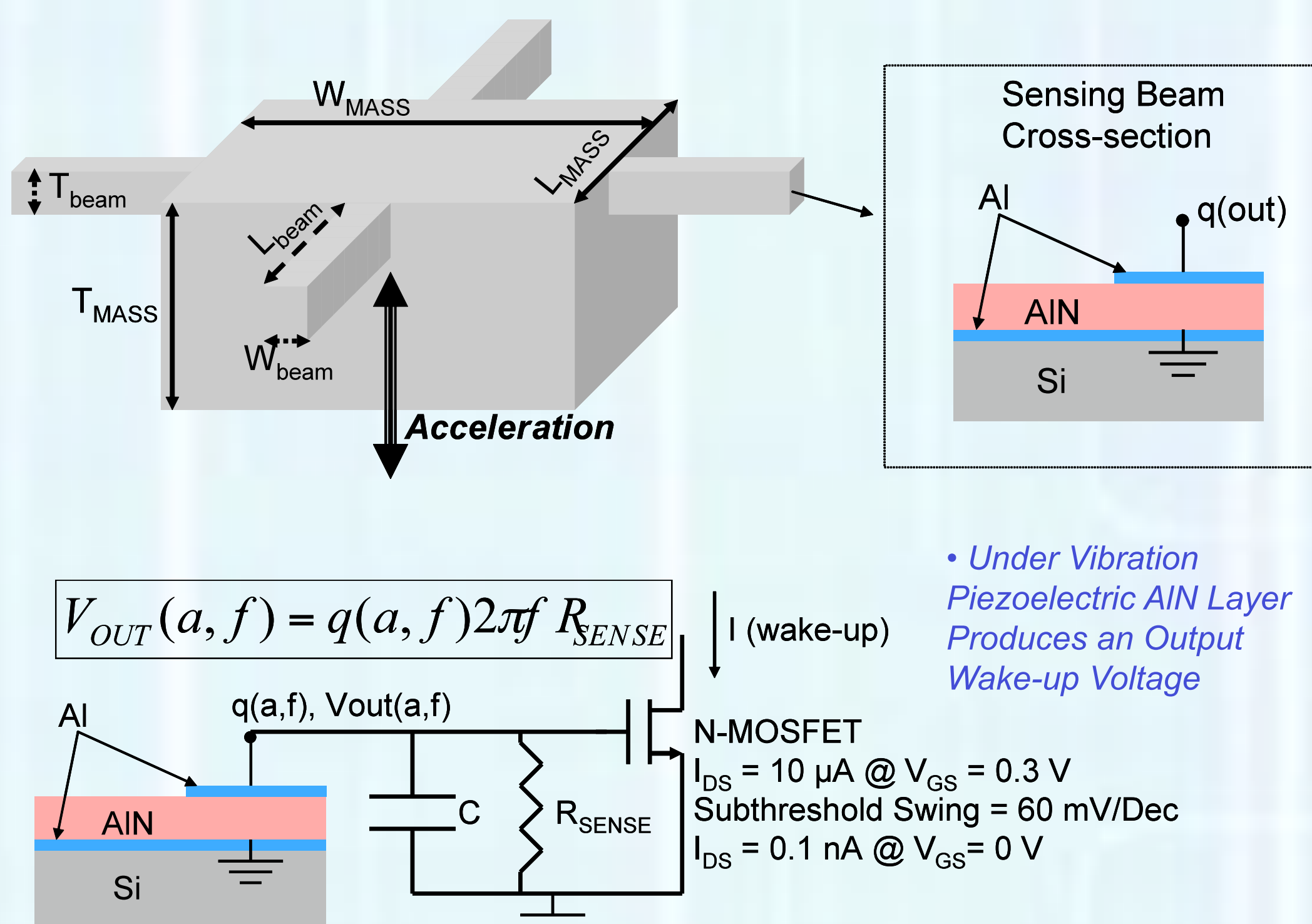
## Approach

- Develop an array of frequency selective MEMS vibration sensors, forming a passive, all mechanical spectrum analyzer over the required frequency range.
- Utilize a zero-power circuit interface to program the wake-up profile by setting a threshold level in each relevant frequency bin.

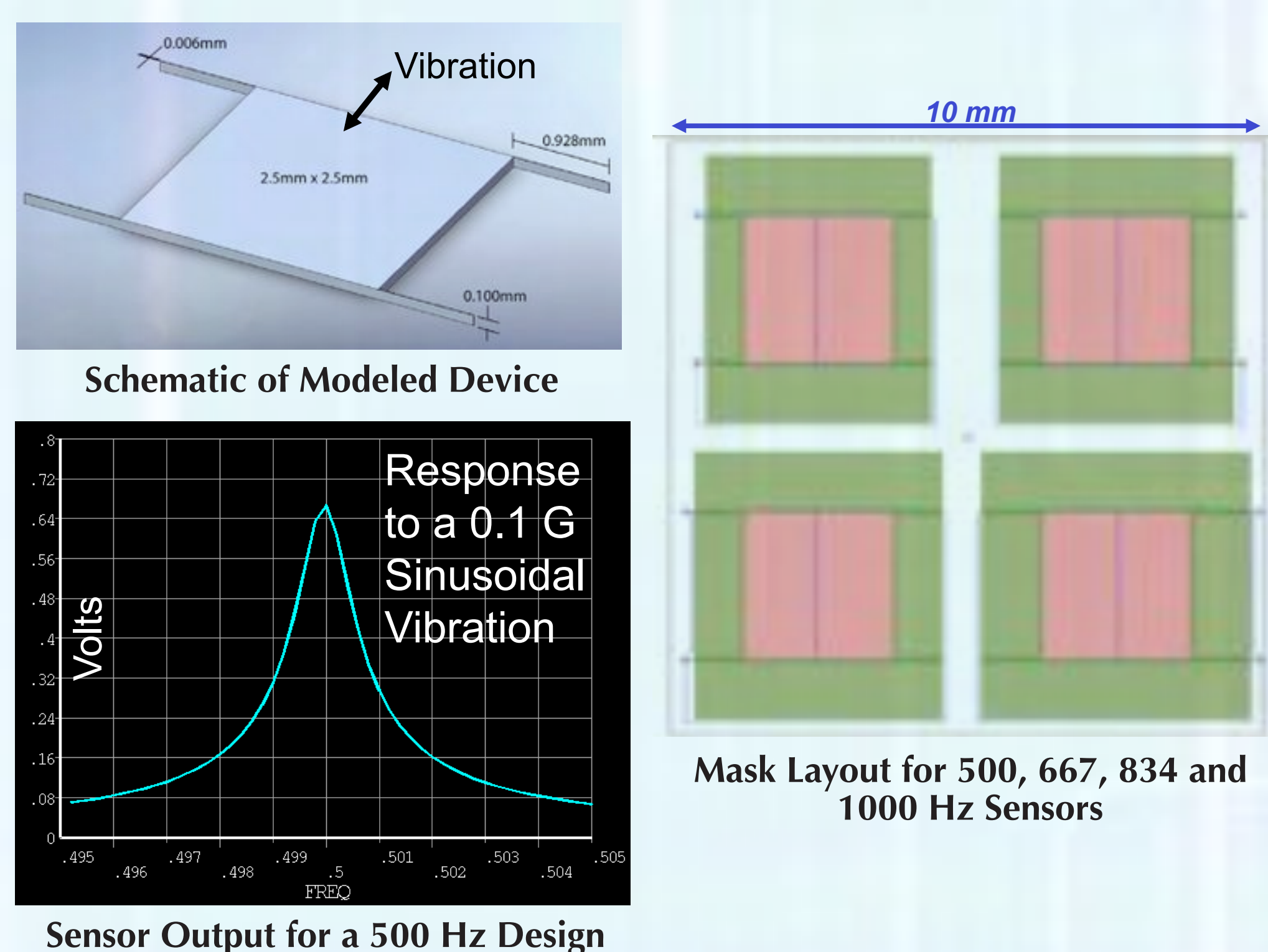


## Results

### Frequency Selective MEMS Vibration Sensor (Operation)

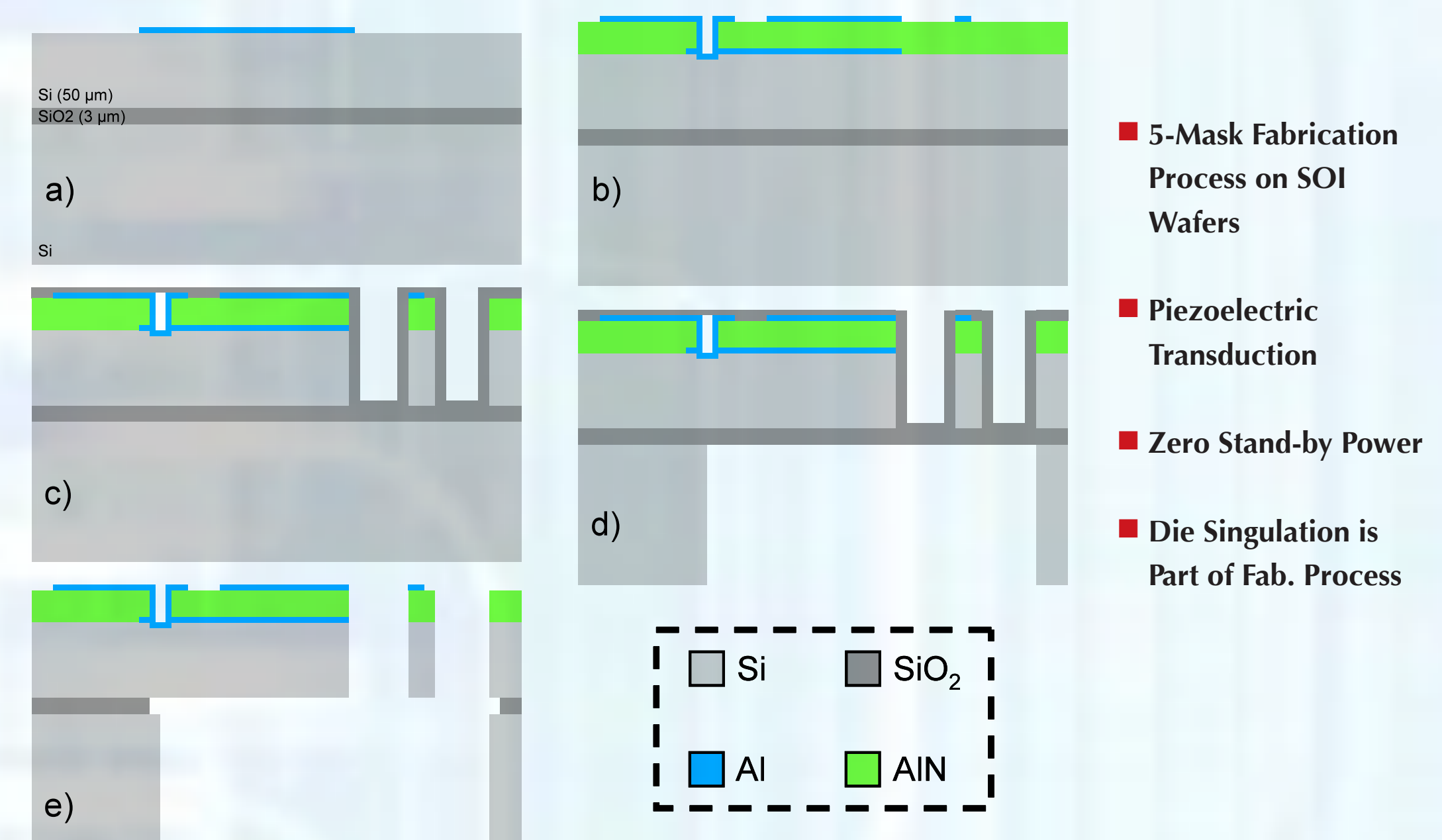


### Lateral Process Modeling and Design

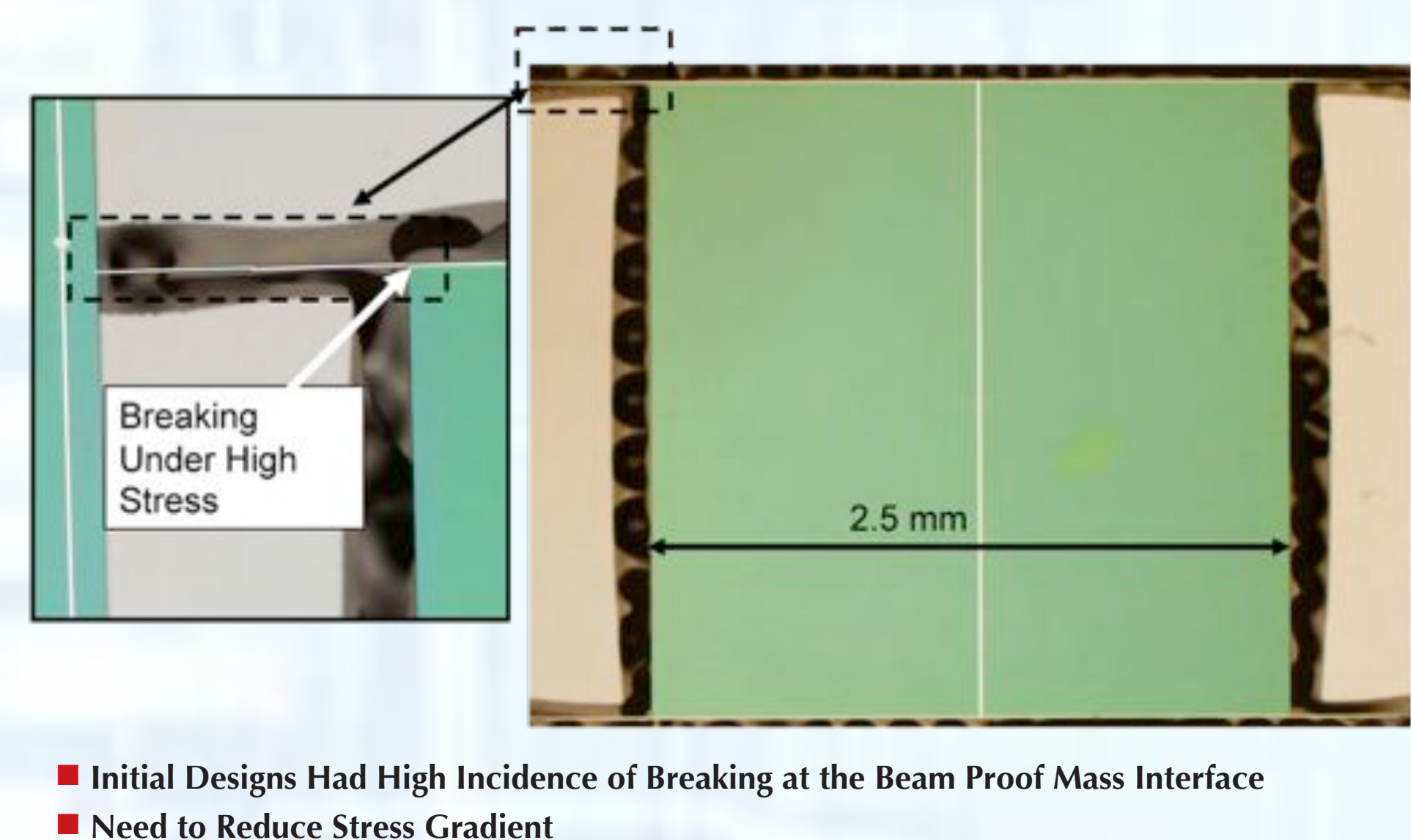


## Results (cont.)

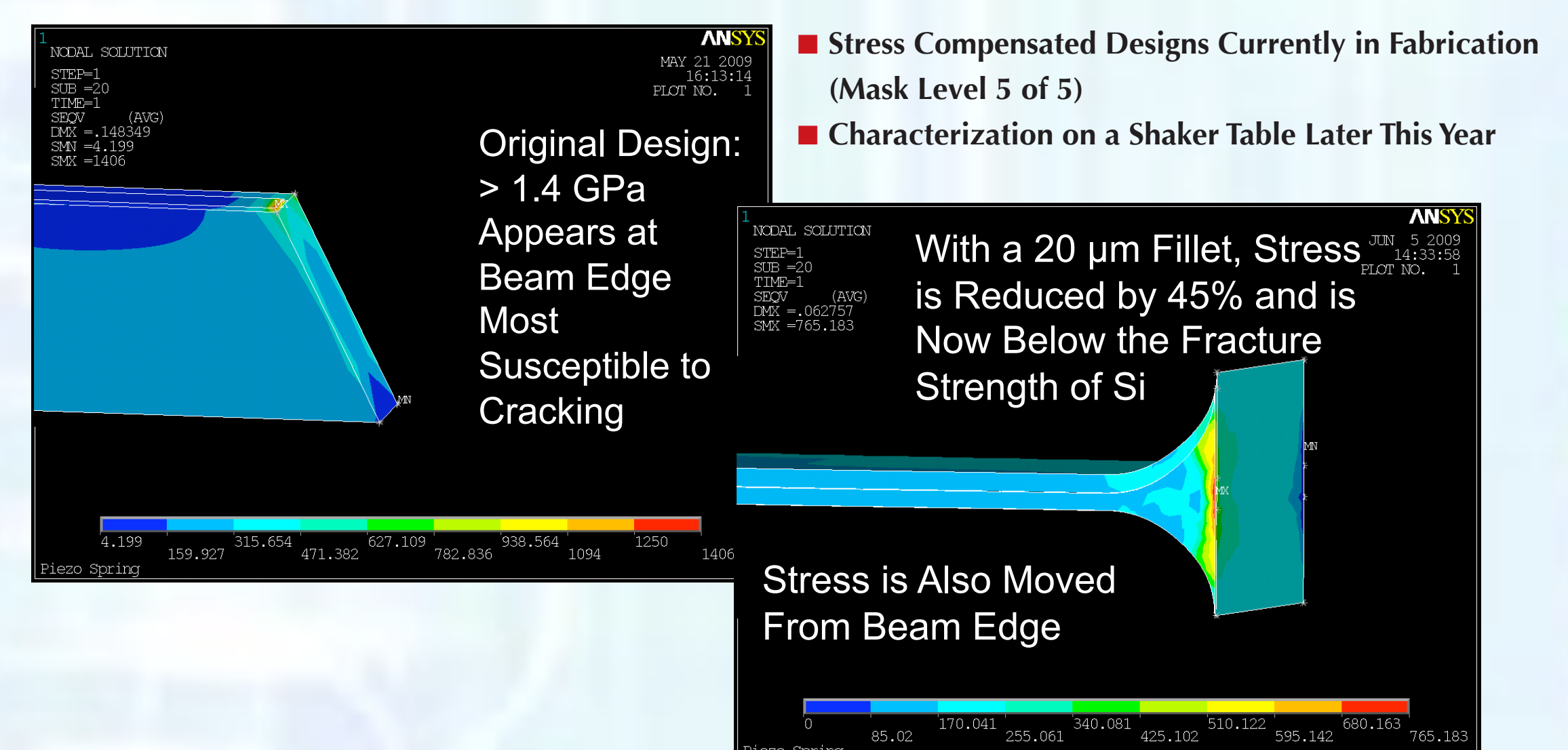
### Vibration Spectrum Analyzer Fabrication Process



### 1st Prototype Vibration Sensor Designs



### Reduce Stress Concentrations



## Significance

- Remote Sensors
  - Longer Life Time
  - Lower Power Consumption
  - Smaller Size
  - Novel Capability
  - Nonproliferation
- Inertial Sensing
  - Low Power
  - High Resolution

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